

IN THE CLAIMS:

1.-24. (Cancelled)

25. (New) A compact bonding apparatus for flat-plate forms of recording media formed by a pair of substrates bonded together, comprising:

a turntable for revolving about an axis having a plurality of substrate carrying parts on and adjacent a perimeter of the turntable, a rotational speed of the turntable is set to enable correction of any warping of the recording media;

a plurality of operational units are positioned sequentially along the turntable perimeter to interact with the substrate carrying parts on the turntable in the following sequence,

a first substrate placement unit for placing a first substrate on one of the plurality of substrate carrying parts,

a second substrate placement unit for placing a second substrate on top of the first substrate with adhesive therebetween on the one of the plurality of substrate carrying parts,

a bonding unit for receiving the first and second substrates with adhesive to apply a vacuum to adhere the first and second substrates together as bonded substrates on the one of the plurality of substrate carrying parts,

a pre-curing standing unit portion of the turntable that occupies one third of the plurality of the substrate carrying parts on the turntable, each holding a free standing bonded substrates that are only being subject to ambient atmosphere and temperature to enable a predetermined rest time period of rotation of the turntable to relieve stress between the bonded substrates and prevent warping of the bonded

substrates, before a subsequent operational process is performed on the bonded materials,
and

a curing unit to irradiate the bonded substrates with ultraviolet light to cure
the adhesive between the stress relieved bonded substrates; and

25 means for setting a rotational speed of the turntable to enable correction of
warping in respectively a radial and a tangential direction of the free standing bonded
substrates as the turntable rotates through the pre-curing standing unit portion of the
turntable.

26. (New) The compact bonding apparatus according to claim 25 further including
the following operational units of

a post curing unit to relieve any post curing hear warping of the cured bonded
substrates resulting from the curing in an ambient atmosphere and temperature for a second
5 predetermined time period, and

an exit unit for removal of the finished recording media.

27. (New) The compact bonding apparatus according to claim 26 wherein the bonded
substrates remain free standing on the plurality of substrate carrying parts on the turntable from
the bonding unit through the post-curing unit.

28. (New) The compact bonding apparatus according to claim 25 wherein the
predetermined rest time period is in a range of 7 to 15 seconds.

29. (New) The compact bonding apparatus according to claim 25 wherein the
plurality of substrate carrying parts are one of a susceptor and a surface of the turntable.

30. (New) The compact bonding apparatus according to claim 25 further including an accommodating part and a plurality of susceptors that can be stored in the accommodating part, the accommodating part can be transported by the turntable between the bonding unit and the curing unit and the susceptor can support bonded substrates in a free standing manner on the
5 turntable.

31. (New) The bonding apparatus comprising a bonding part which bonds together a plurality of substrates coated with an adhesive agent, and a curing part which cures the adhesive agent of the substrates that have been bonded together, characterized in that

the bonding apparatus has conveying means which

5 (1) conveys the substrates coated with an adhesive agent to the bonding part;
(2) conveys the substrates from a vacuum vessel into an atmosphere at room temperature after the substrates are bonded in the vacuum vessel of the bonding part while being vacuumed,

(3) conveys the substrates to the curing part,
10 the conveying means has a conveying section which is located between the vacuum vessel and the curing part, for conveying simultaneously a plurality of the bonded substrates being in contact with only the surface of the conveying means,

the conveying section eliminates internal stress from the bonded substrates by permitting the plurality of bonded substrates to be free standing on the conveying means in the
15 atmospheric pressure at room temperature for a predetermined rest time period to relieve stress between the plurality of bonded substrates and prevent warping of the bonded substrates;

means for setting a transit speed of the conveying means to enable correction of warping in respectively a radial and a tangential direction of the free standing bonded substrates as the conveying means conveys the bonded substrates through the conveying section to the curing part;

a curing unit to irradiate the bonded substrates with ultraviolet light to cure the adhesive between the stress relieved bonded substrates,

a post-curing unit to relieve any post curing heat warping of the cured bonded substrates resulting from the curing in an ambient atmosphere and temperature for a second predetermined time period, and

an exit unit for removal of the finished recording media.

32. (New) The bonding apparatus according to claim 31, characterized in that the conveying means is a turntable which rotates while carrying a plurality of substrates.

33. (New) The bonding apparatus according to claim 32, characterized in that a plurality of the turntables are provided.

34. (New) The bonding apparatus according to claim 33, characterized in that the plurality of turntables include concentric small-diameter and large-diameter tables.

35. (New) The bonding apparatus according to claim 31, characterized in that the conveying means has an accommodating part which stacks and accommodates a plurality of substrates that are conveyed from the bonding part while conveying the substrates to the curing part.

36. (New) A bonding apparatus comprising a bonding part which bonds together a pair of substrates coated with an adhesive agent, and a curing part which cures the adhesive agent of the substrates that have been bonded together, characterized in that

the bonding part has a vacuum vessel in which the pair of substrates are bonded
5 while being vacuumed,

the conveying means has a conveying section which is located between the vacuum vessel and the curing part, conveys simultaneously a plurality of susceptors carrying the bonded substrates being contacted with only the surface of the susceptors and

the conveying section eliminates internal stress from the bonded substrates with
10 atmospheric pressure at room temperature, and

means for setting a transit speed of the conveying means to enable correction of warping in respectively a radial and a tangential direction of a free standing bonded substrate as the conveying means conveys the bonded substrates through the conveying action to the curing part.

37. (New) The bonding apparatus according to claim 36 wherein the transit speed of the conveying means provides a time period within a range of 7 to 15 seconds through the conveying section from the bonded part to the curing part.

38. (New) A compact bonding apparatus for flat-plate forms of recording media formed by a pair of substrates bonded together, comprising:

a first turntable for revolving about an axis having a plurality of substrate carrying parts on and adjacent a perimeter of the turntable;

5 a plurality of operational units are positioned sequentially along the turntable perimeter to interact with the substrate carrying parts on the turntable in the following sequence,

a first substrate placement unit for placing a first substrate on one of the plurality of substrate carrying parts,

10 a second substrate placement unit for placing a second substrate on top of the first substrate with adhesive therebetween on the one of the plurality of substrate carrying parts,

a bonding unit for receiving the first and second substrates with adhesive to apply a vacuum to adhere the first and second substrates together as bonded substrates on the one of the plurality of substrate carrying parts,

15 a curing unit to irradiate the bonded substrates with ultraviolet light to cure the adhesive between the stress relieved bonded substrates,

a post-curing unit to relieve any post curing heat warping of the cured bonded substrates resulting from the curing in an ambient atmosphere and temperature for a second predetermined time period, and

an exit unit for removal of the finished recording media; and

20 a second turntable having a plurality of substrate carrying parts, on and adjacent a perimeter of the second turntable, for receiving bonded substrates from the first turntable after the bonding unit and after one revolution of the second turntable to return each of the plurality of substrate parts to the first turntable before the curing unit, wherein each of the plurality of

25 bonded substrates are held respectively in a free standing manner in a respective substrate carrying part while only being subject to ambient atmosphere and temperature to enable a predetermined rest time period during rotation on the second turntable to relieve stress between the bonded substrates and prevent warping of the bonded substrates, before a subsequent operational process is performed on the bonded materials.

39. (New) A compact bonding apparatus according to claim 38 wherein the predetermined rest time period is in a range of 7 to 15 seconds.

40. (New) A compact bonding apparatus according to claim 38 wherein the second turntable is concentrically mounted within the first turntable.

41. (New) A compact bonding apparatus according to claim 38 wherein the second turntable is rotated adjacent the first turntable and the first and second turntable consist of the only means for conveying the plurality of the substrate for each operational unit in forming the recording media.

42. (New) A compact bonding apparatus for flat-plate forms of recording media formed by a pair of substrates bonded together, comprising:

a first turntable for revolving about an axis having a plurality of substrate carrying parts on and adjacent a perimeter of the turntable;

5 a plurality of operational units are positioned sequentially along the turntable perimeter to interact with the substrate carrying parts on the turntable in the following sequence,

a first substrate placement unit for placing a first substrate on one of the plurality of substrate carrying parts,

10 a second substrate placement unit for placing a second substrate on top of the first substrate with adhesive therebetween on the one of the plurality of substrate carrying parts,

a bonding unit for receiving the first and second substrates with adhesive to apply a vacuum to adhere the first and second substrates together as bonded substrates on the one of the plurality of substrate carrying parts,

15 a curing unit to irradiate the bonded substrates with ultraviolet light to cure the adhesive between the stress relieved bonded substrates,

a post-curing unit to relieve any post curing heat warping of the cured bonded substrates resulting from the curing in an ambient atmosphere and temperature for a second predetermined time period, and

an exit unit for removal of the finished recording media;

20 a second turntable having a plurality of substrate carrying parts, on and adjacent a perimeter of the second turntable, for receiving bonded substrates from the first turntable after the bonding unit and after one revolution of the second turntable to return each of the plurality of substrate parts to the first turntable before the curing unit, wherein each of the plurality of

bonded substrates are held respectively in a free standing manner in a respective substrate
25 carrying part while only being subject to ambient atmosphere and temperature to enable a
predetermined rest time period during rotation on the second turntable to relieve stress between
the bonded substrates and prevent warping of the bonded substrates, before a subsequent
operational process is performed on the bonded materials; and

means for setting a rotational speed of the second turntable to enable correction of
30 warping in respectively a radial and a tangential direction of the bonded substrates as the second
turntable rotates through the pre-curing free standing period of the second turntable in a time
period within a range of 7 to 15 seconds to also allow release of bubbles in the bonded
substrates.

43. (New) A compact bonding apparatus according to claim 42 wherein the second
turntable is concentrically mounted within the first turntable.

44. (New) A compact bonding apparatus according to claim 42 wherein the second
turntable is rotated adjacent the first turntable and the first and second turntable consist of the
5 only means for conveying the plurality of the substrate for each operational unit in forming the
recording media.